

Growing DC

***A Policy Paper on
Washington, DC's Environment***

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PREFACE

A Working Paper for the Office of Planning

Rewriting the Comprehensive Plan and establishing a new “vision narrative” marks a turning point in the urban history of the District of Columbia. It is an act of self-determination by a community seeking to set its own course alongside the Federal City rather than from the shadows behind it. It is a step towards making the policy of *home rule* a physical reality in the public spaces and infrastructure of the District’s neighborhoods.

This Environment White Paper is one in a series of papers commissioned by the District of Columbia’s Office of Planning in preparation for the process of overhauling Washington’s Comprehensive Plan. Representing a synthesis of studies and work that have been undertaken by an impressive array of governmental agencies, non-profit organizations, planners, architects, landscape architects and academics, this paper is an overview of that work and it attempts to draw this work towards the issues outlined in the City Directives working paper. Produced over an intense four-week period, the information is derived from interviews, review of working drafts by stakeholders, agency reports, historic material and comparable national case studies. As stated in other commissioned papers, this information is organized into two broad topics:

- Areas of agreement
- New opportunities and strategies.

During the process of writing this environment paper, the Office of Planning held a series of interagency task force stakeholder meetings to develop the following list of environmental goals:

- Sustainable development
- Excellent park system, meeting a wide range of needs
- Improved network of trails and interconnected open spaces
- Clean, healthy attractive rivers and streams
- Effective solutions for improving air quality
- Safe and reliable drinking water

Working with this list, there are four categories or groups of challenges that the next Comprehensive Plan needs to address. They are the following:

- Clean air and water while decreasing demand for electrical power
- Maintain and upgrade a 200 year-old urban forest, waterways, parks and open space systems
- Enrich and enhance the ecological operations of the urban and natural infrastructure as a tool of economic development and neighborhood revitalization
- Create a sustainable natural environment to support a diverse range of parks and open spaces that will attract 100,000 new residents and serve the changing needs of the citizen, regional worker, national capital visitor and natural habitat

INTRODUCTION

Creating an urban environment to attract 100,000 new residents is different from preparing for 100,000 additional tourists, federal employees or suburban shoppers. Planning for new residents and enhancing the city for current citizens requires public and private sector leaders to envision *growing* the District, not just responding to growth. Growing the District of Columbia for residents is a different type of urban development than the traditional practice of economic development focusing on big redevelopment projects such as convention centers, baseball stadiums and large mixed-use infill projects.

Many visitors experience the environment in Washington, DC (rivers, parks and open space) as a background setting, an amenity or a tourist landmark. Residents experience this same environment as an infrastructure that carries local water resources, cools their homes, and affects their health. It reinforces and enriches the value of community for prospective new residents. Many citizens volunteer precious hours to help maintain their environmental heritage. Their civic identity is linked to this vast urban landscape system. It is the connective network that links a culturally rich and diverse urban social ecology.

Throughout its history of urban planning and urban design efforts, Washington, DC has been a national leader in creating a large, diverse, accessible, and ecologically rich environmental open space system. Efforts by the Federal Government and the District of Columbia have created a system of parks and open space covering thousands of acres and a diversity of ecological environments. As one of the largest urban parks systems in the country, its parks, preserves, boulevards, rivers and urban forest have been the defining quality of the District's economic and residential community. Today this environmental underpinning to the District's economic and social vitality is unsafe, polluted, under maintained, no longer supportive of current citizens demands, threatened by development and ecologically imperiled.

Growing DC is a metaphor that describes not only the physical form and structure of the District, but is used to describe a method of how policy, finance, design and implementation activities work towards a common agenda. It is a method of looking at basic city services and supply systems as a means of stabilizing the environment and improving public landscapes, as well as an ecological tool for economic development, a network for social connectivity, and an ecological process that defines how the public parks, open spaces systems, and environmental systems function.

The District's primary urban image is of tree-lined boulevards, neighborhood streets, and an extensive system of parks and open space. Given this heritage, it is not surprising to find that many neighborhoods and District agencies are looking to new tools and strategies involving *green* building and urban sustainability. Many neighborhood organizations, as well as institutions such as Catholic University, are turning to their urban environmental systems as tools of revitalization. The Deanwood neighborhood is working to claim Watts Branch park system as both a social and ecological restoration project. Catholic University is using the principles of green building to reduce energy costs and make a more attractive and safe campus urban landscape.

The need for active maintenance and cultivation of the rich terrain of this existing urban landscape is another example. *Growing DC* requires the creation of new and better residential communities through the enhancement and augmentation of day-to-day city building processes. That is, by coordinating, building and maintaining small projects collectively new points of access can be opened to make connections within the city's urban environment.

GROWING DC: ENVIRONMENTAL ASSETS

“Nature has done much for it, and with the aid of art it will become the wonder of the world.”

– P. Charles L’Enfant

Evolving from a cluster of small tidewater towns towards the nation’s capital, into a metropolitan region and now a global capital, Washington, DC’s unique environment is derived from its given local geography/ecology resources interacting with constructed spaces and elements drawn from many cultural sources. Its two hundred-year urban history is filled with plans and urban development that interweave a wide range of architecture, park and open space elements into a large and expansive cultural infrastructure. This environmental infrastructure provides the primary urban formal structure that equally frames Federal lands, District commerce and residential communities. The parks, tree-lined boulevards and waterways were the avenues for economic activity and attracted residents to live in this new city. Before Pennsylvania Avenue became a corridor for Federal agencies and cultural institutions, it was one of the first tree-lined shaded commercial main streets in America.

In land-use and tourist maps of the city this diverse cultural infrastructure is defined by a single matte green coloring. This over simplification masks a complex urban landscape, hiding its various scales, system components and ecological functions. In turn, this fundamental urban infrastructure disappears as a critical cultural and natural ecology that needs maintenance and as a vital platform to grow and revitalize the community. In fact, it is a rich and diverse range of environments, parks and open spaces that suit differing land uses, development opportunities, and neighborhood identities. The fact that neighborhoods such as Congress Heights or Brookland attach geomorphic terms to describe their community speaks directly to the city’s diverse terrain.

Environmental Asset: Given and Made Form

The noted landscape architect, Ian McHarg argues in his report *Toward a Comprehensive Landscape Plan for Washington, DC* prepared for the National Capitol Planning Commission in 1965, that Washington DC’s unique physical character and urban landscape identity is the result of the interactive processes between its *given form* and the *made form*.

Given form is defined:

“The basic identity of the place is a consequence of latitude, longitude, elevation and climate, which produce situation. Geological history, with climate, produces physiography and the water regimen. These determine the character and distribution of soils, plants and animals; microclimatic variation; the ecological expression; the natural landscape identity.”

– Wallace, McHarg, Roberts and Todd

Made Form is defined:

“Historical adaptations by man, changing the given form in aggregate, produce made form, the modifying artifacts which are the physical products of society over time. Among these are creations of special symbolic, historic, and social importance which, among ephemera, constitute the critical and expressive elements of the made form.”

– Wallace, McHarg, Roberts and Todd

Given Form:

River and Stream Corridors, Plateaus, Summits, Ridges, Escarpments, Flats and Minor Valleys

“The given form – the landscape identity – is seen from this provisional and exploratory scrutiny to be highly varied. The landscape reveals on its surface, in rocks, physiography and soils, a half billion years in time; it reveals the two major physiographic regions – Piedmont and Coastal Plain – and the greatest contrasts these regions manifest. This interface is dramatized by the Palisades and Little Falls, by the changed aspect of the Potomac River in the estuary. It is vivid in the Rock Creek, the surround of hills with their sedimentary caps, the broad valley of the Anacostia and attendant marshes. Not least, there is the precision of the two Pleistocene terraces, the Pamlico and the Wicomico, with their intervening escarpment.”

– Ian McHarg, *Design with Nature*, p. 178

The District of Columbia is located on two major ecological environments characteristic of the eastern coast – the Piedmont Plateau with its ancient granite and the Coastal Plain with multi-layered sediments. Like the cities of Richmond, Baltimore, and Philadelphia, Washington is located on what is called the Fall Line — the point where an important river flows from the Piedmont and Coastal Plain, as well as the extreme end of a navigable tidal river.

Washington DC also sits at the confluence of two rivers, the Potomac and the Anacostia, which drain the geologically distinct zones of the Piedmont Plateau and the Coastal Plain. The Fall line marks a shift of geologic regimes, where the undulating terrain of the Piedmont meets the escarpments and terraces of the Coastal Plain. Here, the earth drops as ancient crystalline rock gives way to softer, more recent sediments, and the Potomac River opens up into marshy flats.

DC is laid out on an intermediate zone between the Piedmont and the Coastal Plain. Both the White House and Capitol Building, for example, are located on the Pamlico-Wicomico escarpment, an upland piedmont formation that stretches across the lowlands coastal plain. Prior to the planning of Washington DC, early settlers referred to this high ground as Jenkins Hill. When L’Enfant surveyed this land he called this hill “a pedestal waiting for a superstructure.”

This intermediate zone is bounded by the escarpments and hills of the Piedmont plateau as they intersect the Coastal Plain. It is defined by the granite plateau of the Piedmont, the great crescent shape that outlines the intermediate zone or Federal terrace and the undulating rolling hills,

ridges and terraces of the surrounding Coastal Plain; and framed by the river channels and flood plains of the Potomac and Anacostia. These two rivers are the result of a complex watershed that reaches deeply into the District's communities through Rock Creek, Watts Branch, Oxon Run, and Goose Creek to name a few of the many small and medium sized streams that drain the surround hills and terraces. This river system is fed by ground water that drifts through the porous Coastal Plain sediment layers.

This complexity, associated with the historical geological processes and the consequent soil, water, and microclimatic variations, insures diversity in plant and habitat ecology. Under the asphalt of the District, contained within the private yards of residents, and in the expansive parks and open space system there exist eight major ecological associations. Ranging from mixed oak and tulip poplar forests to old marches and magnolia bogs, these plant resources underpin neighborhood identity and their economic value while combining to produce the District's collective signature symbol -- *A City of Trees*.

Made Form:

The Mall, River Basin, Federal Grounds, Boulevards, Interstices, Park System and Open Space Network

In every historic record about the making of a new city or a vision plan for the renovation or expansion of Washington DC, the environment has been a primary point of departure. Its global, national and local political stature has been measured by the natural features and systems that are leveraged to set its multiple civic and community identities. It is a history that includes the environment of the beautiful city, segregated cultural landscapes and ecological invention as well as threat. New York City's signature feature is its building skyline. Washington DC postcards show a city of topographic landmarks and a public realm shaded by a pervasive tree canopy, all of it surrounded by water flowing in many forms. Though the plans for Washington DC have been inspired by other European city plans, such as the architect Christopher Wren's plan for London, England and the landscape architect Andrea Le Notre's grand garden design for Versailles, France, the designers of these plans repeatedly remark that they were involved in making an original American City model. This new type of city, where the intensity of nature and density of its buildings are seemingly on equal footing, is a very American concept of urban places and city building.

Each plan adds an environmental building block to Washington DC's urban landscape. The attributes of this legacy of making an environmental American City model need to be maintained, enriched and expanded. There are many ideas that can be found in past and present plans. Below are just a few ideas from each.

Reinforcing Washington's Given and Made Form: A Legacy of Plans

- *A Plan for the Permanent Seat of the Government of the United States*

P. Charles L'Enfant and Andrew Ellicott, 1792

L'Enfant's plan is based on the interweaving of two different systems of land subdivision, for both economic development and visual enhancement. The first is a scenic landscape of *distant views and prominent buildings*. He organizes the placement of prominent buildings,

boulevards, commercial activities and residential areas in response to the local topography, landscape features and natural systems as well as to diverse real estate and political needs. The second is a continuous grid of blocks and streets to support land development. The grid system utilizes a number of different block sizes, adjusting to the topographic terraces, valleys and ridges. The radial plan combined with the grid system creates a diverse set of spaces at different scales for a range of commercial, residential and government functions.

From a L'Enfant memo, "*...the whole will acquire new sweetness being laid over the green of a field well level and made brilliant by the shade of a few trees artfully planted.*" (*Worthy of a Nation*, p. 27)

- Washington, DC's Central Park

Andrew Jackson Downing, Landscape Architect, 1851

Downing introduces the notion of public recreation and the promenade: walking through an environment in the middle of the city. The park exists in a time when the central mall of Washington, DC was opposite the city's central commercial business district that was located along Pennsylvania Avenue. This park was the "back yard" of the U.S. Capitol building. The capitol's front yard was a public space on its eastern side. It was the District's central recreation park that would become the national mall in 1901. Frederick Law Olmsted Sr. expanded Downing's park notions into his design for New York's Central Park in 1851. Olmsted called his park a *Greensward*.

- City of Trees

Alexander Robey Shepherd, 1871

Under the leadership of Public Works Director Alexander Robey Shepherd, a citywide investment in building a modern infrastructure for the nation's capitol was initiated. Sewer mains, water supply lines, street grading and tree planting were coordinated into one civic project that modernized the city and gave it the moniker "City of Trees." It was arguably as grand a vision as L'Enfant's 1791 network of boulevards and squares. The McMillan Commission and consecutive Washington DC comprehensive plans built upon this first major step to modernize the daily lives of its residents and lay the groundwork for a national and global city.

- McMillan Commission Plan, 1901

Besides the Mall and other civic public spaces for which this plan is famous, several critical elements are added that are crucial for today. The scheme extends beyond the boundaries of the L'Enfant plan and begins to address the new emerging metropolitan region by proposing a network of parks, parkways and stream corridors that extend out into the upland surrounding the central terrace plain of the growing Federal City of Washington. The expansion of the urban tree canopy throughout the city is recommended. They also recommend celebrating the city through the display and demonstration of water rather than statuary in public spaces: the plan called for the extensive design of public fountains. Probably the most powerful concept was to turn the wild Potomac River into an urban boat basin for scenic value and recreational activity. Watercolor sketches showing a new carriage and pedestrian promenade designed in classic *city beautiful* details behind the proposed

Lincoln Memorial still inspire today's plans for waterfront development along other river sections.

- President Lyndon Johnson's Model River – The Potomac River

Ian L. McHarg, 1960s

In the late 1960's, First Lady Ladybird Johnson, working with administration officials, hired young visionary landscape architect and ecologist Ian L. McHarg to produce one of the first comprehensive physiographic inventories and ecological suitability development frameworks for the Potomac River Watershed and Washington, DC This work is the central case study in McHarg's seminal publication on planning and ecology, *Design with Nature*. It is still actively used today. The other report was called, *Toward a Comprehensive Landscape Plan for Washington, DC* At the time, this work on the Potomac River and Washington DC was an international model that established many environmental policy frameworks and design principles in use today. Can Washington DC be the national model once again? And, more importantly, can the District return to the kind of development thinking proposed by Ian McHarg? New digital technological innovation and expanded scientific knowledge makes this type of planning accessible, affordable and useful for implementation.

- The Proposed Comprehensive Plan for the National Capital

National Capital Planning Commission, 1967

This report set the groundwork for the development of today's existing subway system, the Metro. Though one may debate the merits of the architecture and method of land acquisition proposed, this study also laid out ideas for increasing nodes of residential density linked to transit connections. Public pedestrian networks connecting stations to local and regional open space was a critical element of the transportation system. The plan implies the subway be organized at grade to encourage people to use the subway as a recreation vehicle. A brief but critical piece in the section on Urban Design Principles is called *Natural Identity*. The first urban design principle calls for development to follow and enhance the topography and natural frame. For example it states, "... the natural forms of the Potomac and Anacostia Rivers should be maintained through their length ... Gorges and ravines formed by creeks should continued to be preserved as parks. The natural forms of the streams and vegetation should be retained."

- Boundary Markers of the Nation's Capital: A Proposal for their Preservation and Protection

National Capitol Planning Commission, 1976

The forty stone markers that demarcate the boundary of the District of Columbia stand as a powerful democratic metaphor for unfettered movement of free people across political boundaries. There are few of these markers left in their original form. They need to be reclaimed and protected. With the potential to be declared a world heritage site, the markers are every bit as significant as the Great Wall of China, or the defensive walls of Rome, Italy. They form the "stone wall" of the first democratic national capitol city.

- The Proposed Comprehensive Plan for the National Capital

National Capital Planning Commission, 1989

In this report the critical environmental issues related to the current day reality of Washington, DC as a major metropolitan region and interrelated bio-region emerge. The

groundwork is laid for the manner in which District and Federal properties begin to link together into a Metropolitan network. Since this plan, other surrounding county and state agencies have developed environmental strategic plans that are designed not only to produce and preserve open space, but have organized natural systems as a green infrastructure to underpin regional residential and economic growth.

- The Guide to Black Washington: Places and Events of Historical and Cultural Significance in the Nation's Capital

Sandra Fitzpatrick and Maria R. Goodwin

A guidebook, not a master planning document, this book is included because it provides information and calls our attention to vision plans and cultural landscapes over shadowed by the more famous plans. *Though this paper will not explicitly address the issue of local cultural landscapes, it is implicit in the argument for working with the local environment when considering revitalization of existing spaces or new development. It is important to identify these hidden landscapes that are attractive for tourism, economic development and cultural history.*

- Memorial and Museum Master Plan

National Capital Planning Commission, 2001

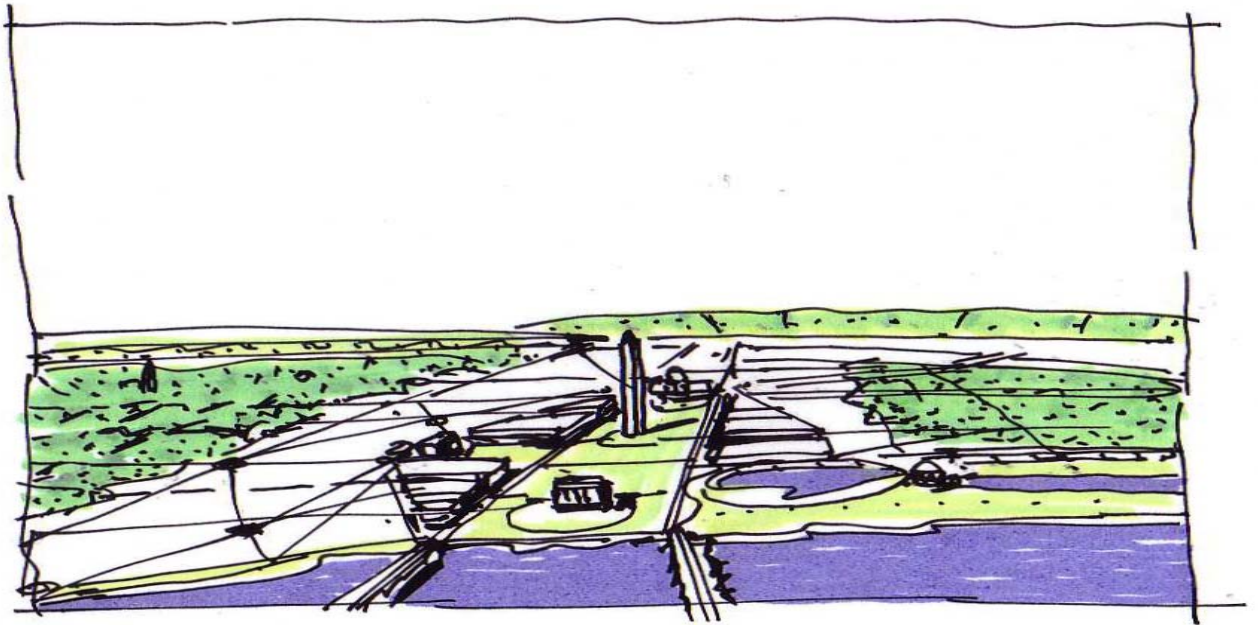
The NCPC proposes to build stronger community linkages between neighborhoods and the Federal landscape by developing more commemorative memorials and national museums out in the neighborhoods. This should not proceed until more of the local cultural history has been identified and marked before it is overwhelmed and potentially buried by Federal expansion.

Together, cultural history and Federal expansion can combine to form rich cultural and ecological intersections, places where citizens and visitors mix local with national history, and values with aspirations. Using a statement from the Memorial and Museum Master Plan report, recommended additions are bracketed, *"Federal and District of Columbia historic agencies [and community groups] should inventory the historic urban design, [ecological landscapes,] and cultural elements of the city."*

Lincoln Park is one such place. Pierre L 'Enfant proposed in his plan that this park would become the new American meridian marking time for the new American age and countering England's global dominance with its Greenwich meridian. Meanwhile this park is home of the Emancipation Memorial and the site of a critical speech by Frederick O. Douglass. This park was the first Lincoln Memorial before the existing monument on the Potomac was opened in 1922.

- The Anacostia Waterfront Initiative and Watts Branch Stream Restoration

Working through Washington Parks and People, 900 people have volunteered their time to reclaim Watts Branch Park from its unsafe and derelict state. The District and National Parks Service has spent thousands of dollars and convened numerous meetings to develop plans for the Anacostia River corridor. The significance of this complex and comprehensive work is its focus on a large area of the city that is usually literally left off maps of Washington, DC or in illustrations for master plans to guide the city's future. Working from the streambeds of Watts Branch, or the eastern shoreline of the Anacostia River, or Anacostia heights offers an



The traditional Federal mall view



The view from Anacostia Heights showing streambeds and shoreline.

alternative perspective. Washington, DC's environment, rivers, parks, and open space, is revealed. Strikingly different from the traditional Federal Mall view, this alternative perspective reveals a far more complex environmental setting, diverse landscape system and ecological structure.

Environmental Asset: Park and Open Space System

The National Capital Planning Commission (NCPC) draft report of June 2003 called *Parks, Open Space and Natural Features* describes the multiple functions that the environmental components of parks and open space play in the form and operation of a vital city:

“Open spaces serve many purposes, such as wildlife habitats, wilderness protection, groundwater retention, air oxygenation, and more user-oriented activities such as active recreational use, decorative settings, historic landscapes, and visual corridors.”

The District and NCPC both agree that the protection of existing open space from encroachment by inappropriate new development, or diminution by inappropriate development on adjacent lands is a critical issue.

The National Park Service (NPS) manages 6,832 gross acres of parks and open space in the District. The NPS operating budget has declined as the number of users has increased over the last ten years. National Parks in the District bring in 15 million visitors a year, generating \$660 million annually. The NPS has been the major manager and provider of parks and open space in the District of Columbia since 1933.

From the 1970s through the 1990s other American cities were building extensive park and open space systems. In the 1990s, many invested in long-term ecological landscape open space systems for recreation, to mitigate urban growth and support new residential development. Because of the District's unique history of trying to achieve its independence and to develop a set of parks and open spaces separate, but connected to the “national park system,” it is now caught mid-stride between playing catch up and moving forward to meet future demands.

The Department of Parks and Recreation (DPR) manages 800 acres of District owned or managed land. They have 78 recreation facilities, 71 playgrounds, 49 community parks, 308 triangle and neighborhood parks, 22 outdoor pools, 67 athletic fields, 1 residential camp, 173 basketball courts and tennis courts and 2 youth gardens.

The District is in the process of a \$122 million facilities renovation and new building construction program. Nineteen facilities in various locations across the city are in the process of renovation. The DPR has received control of the many “triangular parks” from the District Department of Transportation. The agency is currently involved with major planning projects at Watts Branch and Oxon Run parks, as well as along the Anacostia River.

Environmental Asset: Diverse Public Interest and Technical Capacity

The District must capitalize on the technical capacity and lobbying power of environmental groups, building industry representatives, real estate development research organizations and green/ecological technology research centers, as it comes into its own as a full partner with the Federal city, to create a rich metropolitan world capital. The investment in the environment, landscape and ecologically based infrastructure is one of the signature activities of other world cities, such as Chicago, Barcelona, London, and Berlin. Many American cities during the 1990s used a wide array of public interest groups and technology research centers to help them improve the ecological and environmental qualities and quantities of their parks, open space and infrastructure. The District has the opportunity to not only catch up with other communities, but to learn from their experiences.

GROWING DC: ENVIRONMENTAL CHALLENGES

American cities are going through tough fiscal times, as the nation's economy sorts out its next growth direction. Washington, DC is in the midst of a growth cycle, while at the same-time struggling to balance its unique budgetary situation as a ward of Congress. Many communities are turning to the social capital of public interest groups and technology research centers. Washington, DC has a rich and wide range of local and national groups and technical capacity that is down the street from City Hall and active in the neighborhoods from which support may be sought.

Environmental Challenge: Competing Visions of the Environment

The city L'Enfant delineated, with its radial nodes of intersection, was also a city of many centers. *"The decentralized multi-centered city encouraged a diffusion of industrial and commercial location, and the growth of distinctly separate communities in each of which were found diverse income and ethnic groups."* (Worthy of a Nation, p. 18)

A Divided Landscape

In a number of histories that describe the development of Anacostia heights, residents referred to their geographic location in the District as the *"village across the river from the mainland."* This is an important observation about social and cultural separation, but also an excellent reading of how each neighborhoods situated across Washington, DC vary topographically. Further, it is a critical observation concerning past Washington, DC planning studies that tend to overly concentrate on the urban form described by the limits of the L'Enfant Plan and are blind to the other urban settlement situation and patterns on the heights and in the valleys of the rest of the District.

The L'Enfant Plan occupies about 25% of land area of the whole District. The coastal terrace of Anacostia heights is a very different landscape than the upland hills and valleys that surround and extend to neighboring communities. Pierre L'Enfant set the city into the basin formed by an escarpment to the North and the two conjoining rivers to south. The basin was only flat by comparison to the surrounding land, however; massive amounts of earth had to be moved to level the ground enough to lay down the infrastructure of roads and pipes. L'Enfant's web of radiating boulevards extends toward, but stops short of, the more topographically dynamic surroundings. Beyond the Federal plain, north of Florida Boulevard, south of Hwy 395, and across the Anacostia River, the social landscape is governed by the rise and fall its natural terrain. Through their names, the neighborhoods align themselves with the upland contours of hills and small valleys.

Reviewing Washington DC's historic urban morphology shows that DC grew in two ways. Growth concentrated along the boulevards and squares of the L'Enfant and McMillan plans. Meanwhile, there was the development of a series of villages or model towns in the valleys and on the heights on the other side of the mainland borders. For instance, Howard University, LeDroit Park and the city of Anacostia are villages and campus communities that are distinctly different urban places than neighborhoods around Dupont or Logan Circles.

Many Lines of Authority

The complex overlay of agencies and authorities that own, operate, manage and define the terms that set the quality of the environment include U.S. Army Corps of Engineers, the District of Columbia Water and Sewer Authority (DCWASA), the DC Department of Environmental Health (DOH), the National Park Service (NPS), the National Capital Planning Commission (NCPC), the Department of Transportation (DDOT), the Department of Parks and Recreation (DPR) and a number of neighboring city and county systems surrounding the District's borders. This bifurcation of open space visions and authority over the natural systems creates a disjointed environment. It makes it very difficult to create a rich multi-layered environmental system and ecological network linked to economic and community development. With so much of the District's environmental background and ecological systems outside of its direct control or management, it is difficult to use natural systems and landscapes as building blocks of neighborhood revitalization. If DC is going to grow its residential community, it will need to enhance and enrich the existing environmental system towards the local community. The overlap of these planning, design and maintenance activities inhibits the ability to create an ecologically sound infrastructure and the duplication of effort amongst agencies is a waste of precious funding.

The District of Columbia covers 39,000 acres. The plan surveyed by L'Enfant and Major Ellicott covered about 8,000 acres or about 20% of the existing District. Yet, 40% of the land in the District is either owned or managed by the Federal government.

The National Capital Planning Commission's *Memorial and Museum Master Plan*, published in December 2001, builds on many of the recommendations of a previous comprehensive plan from the NCPC called *Extending the Legacy*, completed in 1997. On the cover of the *Memorial and Museum Master Plan* is a diagram that represents the report's basic parks and open space organization concept for the extending the Federal Capital core out across the District. This diagram proposes to extend the "the museum and monument mall" from two points: the primary center (the Capitol building) and a secondary point (the White House). The lines that radiate from these points intersect a crescent-shaped boundary line demarcating the Potomac and Anacostia Rivers. At the west, east, and south intersections major national monumental centers are proposed. In the report, drawings illustrate the development of a new major mall extending southward to the Anacostia River along South Capitol Street among other gigantic open space interventions.

These plans purport to be built on the legacies of the L'Enfant and McMillan plans. However, the brilliance of these two historic plans, that the Legacy and Monument plans miss, is that the environment to the east and south are very different terrain than to the west and should be treated differently. The historic plans use an intersecting network of diagonal boulevards, block patterns and a system of parks rather than a giant mall. Not only is this more suitable to the local ecology and landform, but it is a critical pattern through which local District neighborhoods and Washington Capitol functions can intertwine into a rich fabric.

The second critical point is that the two rivers, the Potomac and Anacostia, are two entirely different landscape spatial types that defy the overly simplistic crescent-shaped diagrammatic

form of the Memorial Plan concept. This is clearly seen in renderings of future spaces for the Anacostia River, which is a tidal estuary basin. The images evoke building edges and bridges that reflect Memorial Bridge and the Lincoln Memorial edge on the Potomac River, rather than the edges and spaces of the Anacostia, which is a very different place. In fact the Potomac River and Anacostia River are radically different bodies of water. To refer to the Anacostia River as the eastern branch of the Potomac River hides the basic ecological differences of these two inter-related hydrological bodies and therefore any master planning proposals for these areas. Extending this imagery to the Anacostia River destroys the power of the Memorial Bridge and the Lincoln Memorial as a national landmark symbolizing Civil War reconciliation.

Visions of a city served by the great Potomac River and its branch, the Anacostia, providing the city an urban water basin for commerce and scenic pleasure has dominated national and District “vision plans” for the District and National Capitol. This *city beautiful* interpretation of the waterfront and rivers as a scenic background to civic architecture buries a more diverse and varied river and city building vocabulary.

Extending design language of “updated” *city beautiful* Federal styled parks, monuments and open space strategies of heroic mall and monster boulevards is an over-exaggeration of a brilliant design idea for the core of the Federal Capitol. It is devastating and costly to surrounding neighborhoods and economic development of new working and commercial nodes. Also, it eclipses the possibility of creating new symbolic landscape, environments and ecology that speak of new histories and local narratives. Washington, DC needs a new vocabulary of environments, landscape and ecology that create richer boundaries between the Federal city and the District neighborhoods, while retaining a national symbolic stature.

Environmental Challenge: Air Quality

The air in the District of Columbia does not meet federal air quality standards for ground level ozone and most likely will not meet a new federal standard for small particulate matter (PM-2.5) that took effect in 2002. According to a report by the District Department of Health, Washington, DC ozone is largely due to diesel exhaust and dust. Particulate matter is extremely high. Air quality monitoring by the National Parks Service indicates that the District currently has 20% to 40% more PM-2.5 in its air than the EPA standard will allow. The District’s Air Quality Division does not expect this situation to improve during 2003.

The major portion of PM-2.5 in the District’s air comes from vehicle exhaust, according to analysis of the National Park Service data by EPA’s air quality lab. According to the Union of Concerned Scientists, diesel-powered vehicles account for nearly two-thirds of all particulate matter from U.S. transportation sources. A typical diesel engine emits as much as 100 times more small particles than a smaller-sized gasoline engine. A major portion of the particulate matter in the District’s air comes from diesel-powered vehicles. In a Sierra Club report the risk from air pollution in the District is rated “relatively high.” While, a recent Environmental Defense Fund Scorecard ranked the District as having the highest cancer risk from all sources: “Most telling, the District also has the highest risk for cancer from ‘mobile sources’ (vehicle) pollution, with an added cancer risk of 230 per million.”

Environmental Challenge: Water Quality

The District's environmental identity and health are defined by the water quality of its Potomac and Anacostia Rivers. According to the District of Columbia's Water Quality Board Executive Summary, 38.40 miles of the District's rivers and streams are "not supporting" to human use. The uses related to the quality of habitat for aquatic life were at least partially supported. No water body monitored by the Water Quality Division fully supported all the designated uses. The Potomac River is part of an 11,500 square mile watershed. Up to 180 million gallons of water per day are taken from the Potomac River for treatment and use in the District. It has been rated the 12th most endangered waterway in the country by American Rivers. According to a report from the Potomac Conservancy, the Potomac River supplies water to 80% of the 4 million residents of the Washington, DC region. The river is the wildest river running through a metropolitan area anywhere in the world. Its watershed faces unprecedented environmental challenges as a result of population growth and development pressure on both land and water.

Although the eight-mile long Anacostia River is surrounded by parkland, it is severely polluted by sediment, pathogens, and toxins and is one of the ten most polluted rivers in America. During heavy or even moderate rains, untreated sewage overflows into the Potomac, the Anacostia and Rock Creek at 60 discharge points. These combined sewage overflow (CSO) events occur as often as 75 to 80 times a year, dumping an average of 1.3 billion gallons of untreated sewage directly into the Anacostia River alone. A National Resource Defense Council report states that the Anacostia's 17 discharge points receive 66% of the total overflow, with an average of one CSO every week.

The sewer lines and pumping stations need updating, stormwater flows in the District need to be reduced, and this need is compounded by the effects of stormwater drainage flowing into the systems from Maryland's growing suburbs. Plans to reduce these overflows are presently under review by the Environmental Protection Agency. A primary component of this project is the digging of two large underground tunnels. These tunnels operate as holding reservoirs for overflow during major events. The first tunnel is over a mile long under the northeastern section of the District, running from Capitol Hill to the Shaw neighborhood. Construction of a second tunnel is planned under the Potomac River along the Georgetown and Rock Creek waterfront. DCWASA is asking the Federal Government for 62% of the estimated \$1.2 billion project costs. The full project, including both the Anacostia and Potomac Rivers, will take 15-40 years to complete. If the first phase is the Anacostia River system, which is dependent upon funding streams at least 12-15 years from completion, then the rivers will remain polluted for the next 12-15 years. According to the Casey Tree Foundation, this major engineering plan to reduce combined sewer overflow will also dramatically increase water rates by an undetermined amount through the duration of its implementation. This plan does not include any additional stormwater management actions.

Some cities are actively pursuing alternative and more localized methods of stormwater management. The City of Portland, Oregon, now requires all new development and redevelopment projects to incorporate low-impact on-site development design strategies that assist in reducing run off on the property where it originates. Managed through the Department of Environmental Services, the processes mimic natural systems that allow water to percolate

into the ground and filter out pollutants. The result is significantly reduced volume and pollution levels of stormwater run off. The city has created a Stormwater Management Handbook outlining the care and maintenance of this simple on-site stormwater management infrastructure for property owners. Guidelines range from on-site percolation systems to native plant re-vegetation concepts for local streams and wetlands.

In addition to management of CSO overflow, the District's Water Quality Board listed the following issues of special concern:

- *Control of Toxic Substances.* Several studies sponsored by the District have shown high levels of toxic pollutants in riverbed sediments, particularly within tidal Anacostia. The sources of these toxics are not well understood and evidence continues to show that the sources are non-point in nature. The clean-up of toxins in bodies of water is an expensive, yet crucial endeavor. If left untreated, the problem will be compounded because of the limited remediation options available for an urban area.
- *Wetlands.* The District recognizes that coordination, participation and review of all wetlands-related activities will be necessary if any benefits are to be realized. Several key issues need to be addressed before these activities can continue: adequate capital and operation funding; appropriate projects for suitable sites; adequate habitat and plant monitoring; reduction of the use of toxic reclamation soil; and an increase in public education and participation.
- *Anacostia River Restoration.* As the two main tributaries of the Anacostia River are found in Maryland, any effort to restore the river must be taken at the watershed level. In addition to controlling CSO overflows, any restoration plan needs to include actions to reduce toxics, non-point source pollution, restore wetlands and sub-watersheds.
- *Nutrient Reduction Strategies: the Chesapeake Bay Initiative.* The States of Virginia, Maryland, Pennsylvania, and the District of Columbia signed the Chesapeake Bay agreement to clean up the Bay in 1987. The success of nitrogen reduction at DCWASA's Blue Plain's treatment plant should not lessen the need to control nutrients from other sources such as non-point source pollution and CSO.
- *Matching Funds.* The District, along with several union territories, is exempt from Federal State Revolving Fund (SRF) requirements as it has only one level of government. The U.S. Congress passed a bill allowing the District and other territories to use the SRF under Title II provisions. However, the District and the territories are not receiving the same benefits generally associated with SRF funds. Under SRF, states are expected to provide 20% match to any Federal money received, whereas the District has to provide a match varying from 33% to 82% of the Federal grant depending on the project. The District has requested that U.S. Environmental Protection Agency and the U.S. Congress eliminate this disparity so that the District is not at a disadvantage to receive the Title VI funds as Title II funds.
- *Federal Facilities and Land in the District of Columbia.* About 40% of the land in the District of Columbia is either owned or managed by the Federal government. In addition,

most of the lands bordering the Potomac River, Rock Creek, and the Anacostia River are federally owned. The District clearly will never be able to fully control non-point source run-off to its surface and ground waters without the cooperation of these Federal facilities.

- Potable Water Supply. Drinking water for all District residents comes from the Potomac River via the Washington Aqueduct, a system of pipelines, reservoirs and treatment plants that began operation in 1863 and today serves over a million people in Washington, DC. The Army Corps of Engineers manages the city's drinking water. It is planning major construction projects to eliminate pollutants generated at the Dalecarlia facility to comply with the permit requirements of the EPA. Over 12,000 miles of water pipes connect water treatment facilities to homes and businesses in the DC area. Major upgrades and modernization of the entire treatment system, including the distribution system, may also be necessary, according to an executive summary from a working paper by the Office of Planning.

The District's water supply system contains lead. In a schedule imposed by the EPA, DCWASA is required to replace the District's aging residential water service lines that extend from the house to the street service line. DCWASA must replace 7% of the water service lines per year until such time as the lead levels in the water at a select number of sampled locations fall below the EPA action level of 15 parts per billion. The scheduled work on replacement and upgrade has been slowed by delays in District agency permitting requirements.

DCWASA is in the process of a system wide inventory and assessment of its function and operation. This study should be finished in 2006.

Environmental Challenge: Urban Forest – A Green Infrastructure

In November 1999, the Washington Post ran two images captured from a LANDSAT satellite showing the dramatic decrease in tree canopy within the District of Columbia. The article stated that the city had lost 64% of its trees during the period between 1973 and 1997. In response to this article, Mayor Williams stated, "...trees are a metaphor for public space." According to the Casey Tree Foundation, 42% of the existing street trees need serious attention.

In a report by the American Forests on the urban ecosystems of Washington, DC region, their analysis illustrated how the urban forest functions as what they call a "green infrastructure," and described how the Washington, DC urban forest provides ecological benefits for managing stormwater and mitigating air pollution. The five county metropolitan region is comprised of 187,767 acres of tree canopy (46%), 110,300 acres of impervious surfaces (27%), 70,747 acres of open space (17%), 27,072 acres of bare soil area (7%), and 11,036 acres of water surface. The total stormwater retention capacity of the urban forest on these lands is 949 million cubic feet in avoided storage of water and is valued at \$4.7 billion (based on construction costs estimated at \$5 per cubic foot to build equivalent retention facilities). The urban forest provides air quality benefits by removing nitrogen dioxide, sulfur dioxide, carbon monoxide, ozone and particulate matter 10 microns or less. The metropolitan DC area's urban forest removes 20 million pounds

of pollutants from the air each year, a benefit of \$49.8 million annually in alternative air cleaning resources.

The American Forests analysis showed that the District contains over 36,000 acres of land, of which 22% is covered with trees, 2% is bare land, 46% is impervious surface, 19% is open space, and 11% is water surface. The trees removed 878,157 pounds of air pollution. The retention volume required to mitigate loss of trees is 68,763,823 gallons and the stormwater control value is worth \$137,527,646.

At the scale of the Anacostia River, their analysis determined that 44% of the area is covered with impervious surfaces, 28% is tree covered and 26% is open space. The value of the green infrastructure is a total savings of \$13.5 million for stormwater control and \$800,000 in air pollution mitigation annually. These savings are potentially funds that could be used to clean the Anacostia River.

According to the Casey Foundation, the loss in tree canopy results in:

- *The loss of civic and neighborhood identity.* Washington, DC has been known from its founding as the “City of Trees.”
- *The loss of air quality.* In Metro DC, the trees removed 20 million pounds of pollution, valued at \$49 million.
- *The increase in heat island effect.* Trees work as natural barriers to dust, wind, snow, rain, and sunrays, controlling climate in micro-areas. Planting trees provides shade that can help cool the city in summer. Three trees planted in optimal positions around a house can cut air conditioning requirements in half. In the winter, the trees protect the house from the wind and can reduce heating bills by one-third.
- *The loss of wildlife habitat.* Trees and urban forests provide habitat for wildlife. Home to over 170 rare, threatened or endangered avian species, the District is one of the most concentrated areas of such birds in the nation.
- *The increase in noise.* Trees act as noise barriers. Plants, trees and bushes absorb a lot of the noise associated with urban areas. In some cases, landscaping can even cut noise in half.
- *The loss in tourism.* 700,000 tourists visited the cherry trees last year.
- *The loss of commercial streetscape activity.* Studies show that consumers spend 12% more in stores with tree covered public sidewalks.
- *The increase in crime.* Neighborhoods with trees experience less crime.
- *The reduction of stormwater remediation.* In the Washington, DC metro area, the tree canopy reduces the need for retention structures by 949 million cubic feet. Using a \$5.00/cubic foot construction cost, trees saved the region \$4.74 billion per 30-year construction cycle.

American Forests reports that the loss of tree canopy has cost the District at least \$230 million in stormwater management value and air pollution removal value.

- The loss of property value. Real estate sales show that homes with large trees sell for 10-20% more.

Environmental Challenge: Habitat

According to a report from the Sustainable Washington Alliance, the Capital region is a nationally significant wildlife migratory corridor. More than one third of the bird species that inhabit North America can regularly be seen in the Washington, DC metro region.

Official efforts to restore and protect the Anacostia watershed began in 1987. Evidence of positive environmental change includes the reappearance of submerged aquatic vegetation, which has supported growing fish population and the arrival of four new species of fish within the last five years. The larger fish population has brought more waterfowl to the river. Since 1994, however, the District has had a fish consumption advisory recommending that no locally caught bottom dwelling fish (such as catfish, eel and carp) be consumed, and no more than half a pound of game fish (such as largemouth bass and sunfish) be consumed by an adult per week.

Environmental Challenge: Energy

The District's energy landscape is based on outside energy services. Further, 85% of the dollars spent on energy do not turn over once in the District. The District imports 90% of its electricity and all of its natural gas. Unlike most states, the District does not have natural resources that could be used to generate energy; it can only rely on using external renewable energy sources. According to the District's Office of Energy (DCOE) report,

"This condition leaves the District more vulnerable to energy source supply and demand dynamics, further reinforcing a sustainable energy position for the District Government via the efficient and conservative use of energy."

The District's Office of Energy states that the District Government will spend \$53 million on energy in 2003, a modest increase of 1.4% over 2002. Their report states:

"Many organizations tend to de-emphasize or place less focus on expenditure areas when expenses from one year to the next increase modestly or remain about the same. However, this is a luxury that the District Government cannot afford. This is especially true since most of the energy is imported and the District may be faced with financing new production and distribution facilities through increased rates as the nation's energy service companies look to modernize the system's deteriorating infrastructure and add capacity to an already strained energy infrastructure.... Without concerted, deliberate efforts to conserve and reduce energy, energy costs will consume an ever greater portion of the government's budgets, draining dollars from other much-needed public services."

Residential energy consumption, which includes single-family and multi-family dwelling units and public housing units, represents one-fifth of the aggregate energy consumption in the District. Residential consumption will increase for two reasons – increased number of new higher density units, and a projected increase in population and household expenditures.

The combined effect of both population and housing increases is likely to increase energy demand, particularly for electricity and natural gas. Although improvements in housing envelope construction and design, increases in appliance efficiency, and weatherization and retrofitting of existing housing stock with energy conserving technology is likely to offset some of this increase, demand is projected to grow in the future.

DCOE's report states,

“Although 19,365 families and 109,500 individuals in the District are at or below the federal poverty line, 52,234 households are at or below 150% of the federal poverty level. As energy costs continue to rise, many low-income households will be less able to pay their utility bills. The National Center for Appropriate Technology estimates that up to 30% of the annual incomes of low-income families and the elderly are spent on direct and indirect energy costs.”

The DCOE report describes that the Commercial/Industrial Sector accounts for 65% of the total usage in the District, with the commercial Sector being the single largest user of energy. Electricity consumption is the dominant energy source for the Commercial/Industrial Sector, representing 80% of the dollars spent on all energy sources. While Industrial Sector expenditures for electricity have declined dramatically over the 10-year period, Commercial Sector expenditures have almost doubled. The report states:

“These sectors remain prime targets for energy conservation initiatives since the Commercial Sector is experiencing growth and the Industrial Sector is aging. The procurement of Energy Star labeled products and deployment of green building design concepts/materials will need to become the rule versus the exception if these sectors are going to make significant improvements in energy use and expenditures. Influencing the Commercial/Industrial Sector will be a challenge, especially if no incentives are offered that encourage and promote less use and more conservation measures.”

The generation and transmission system is in the process of converting to a deregulated system of inter-related private companies who receive their primary power from generators in Maryland and Ohio. The Retail Electric Competition and Consumer Protection Act of 1999, that took effect in the District in January 2001, “unbundled” retail rates into three separate categories: generation, transmission and distribution. Unbundling allowed consumers to compare prices among electricity suppliers and helped the Commission to determine “shopping credits” or “price to compare.” As stated in the report:

“In light of these decisions to pursue competitive markets for electricity and natural gas, all DC residential consumers can now choose their electric generation and transmission supplier and commodity gas supplier. Although the future of the competitive marketplace

is still not clear, the increased need for residential utility consumer education and information is at an all-time high.”

The DC Office of Energy (DCOE) states that the future capacity of this system is based on achieving 43 recommendations. The primary goal of these recommendations is to decrease energy consumption by 1% per year as the region grows. In the words of the DCOE, “However, that desired goal might be difficult to reach with the projected increases in population, residential and commercial construction and employment.” According to the District Public Service Commission, average household energy use will increase from 750kw/hr to 1250-1500/kw/hr in the next ten years. The DCOE seeks to achieve their goal by having system providers and consumers:

- Increase energy efficiency and innovation,
- Enhance energy affordability and availability, and
- Promote energy collaboration and security.

The region’s power grid is under pressure to meet demands of a growing metropolitan region that is hungry for “un- interrupted” power supply. The recent Northeast Blackout and Hurricane Isabel have revealed some indications that the existing power grid system might be under maintained, needing both major upgrades and burying of power lines. In a Washington Post article of October 21, 2003, it was stated that PEPCO was revisiting the issue of burying overhead lines that stretch through the District and region. The article indicated that this project could “run as much as \$3 billion a mile, according to a report issued to the Maryland Public Service Commission in 2000.” The article further relates that the cost of such improvements would be divided by new customers and be included as hefty surcharges on electric bills. The issue of heavy construction required for these power lines will be a concern to neighborhood groups as it was 12 years ago when PEPCO announced plans to bury lines near American University.

The various energy reports do not define what thresholds are needed to meet their goal of reducing demand by 1%. They are relying on local government to encourage new development to be low impact energy users. If this approach does help meet regional energy needs then private sector vendors will have to enhance their existing facilities. It is not clear whether new private power vendors will be requesting permits to increase power production in their existing facilities and/or re-open existing closed power plants.

It is not clear whether this plan will help the region or District to reduce smoke from existing power plants or need for new giant grid transmission lines. The emphasis is on the process of privatizing as the tool towards meeting energy demands.

Environmental Challenge: Parks, Recreation, and Open Space

Green Spaces for DC <www.greenspacesforDC.org/> presents the history of the DC park system on their website. When Pierre L’Enfant completed his design for the District of Columbia, green spaces were a major component of his vision to make the capital of the United States one of the most beautiful cities in the world. Initially, the Federal Government was responsible for the

management and maintenance of these public spaces, including parks, school grounds, library lawns and even the small triangle parks formed where diagonal avenues intersect grid streets. With the coming of home rule on the early 1970's, many of these areas were transferred to the District of Government – but unfortunately without the necessary funds to care for them properly. As a result, countless numbers of parks and open spaces fell into disrepair and, as other demands were made on the District budget, the cost of returning these green spaces to their former glory became prohibitively expensive.

At the present moment, the Department of Parks and Recreation (DPR) does not have a full inventory of facilities and properties under their control. This makes it very difficult to assess whether the District neighborhoods are adequately served by the existing system or able to meet changing demographic needs. A quick visual assessment does show that areas targeted for new residential growth such as NoMA are lacking adequate parks and open space. DPR programs and facilities are not geared to the 25-60 year old population that the District proposes to attract and they lack recreation spaces for organized activities. Parks are not well located to serve new residential development. Existing facilities are outdated and small.

Adequate parks and open space funding and the designation of Departmental responsibilities are major concerns. At present, parks are maintained through a mix of Department, neighborhood group and non-profit efforts. As reported in the Casey Tree Foundation report, the trees, parks and open space places and systems are suffering from long term deferred maintenance. There are issues of maintenance, oversight and responsibility between DPR, NPS, and DDOT due to limited funding, confusion over ownership, management, the lack of training and poor signage.

According to a report from the Committee of 100 on the Federal City, the Fort Circle Park lands are in a deteriorated state and unsafe. A spokesperson for Washington Parks and People mentioned that the issue of clear and proper policing by park and DC police is a problem with many of the parks and open spaces areas in the City. Many of the parks lack ready access to nearby Metro Stations. The non-profit citizen based organization, “100 Friends of Washington DC” state in their report on the District’s parks that, “park police do not adequately patrol the parks and uniformed park rangers in DC lack law enforcement training and authority.”

The District’s park landscape ecology is threatened by invasive plants, under-maintained trees and polluted natural systems. Adjacent development has a negative impact on parks and open space.

Environmental Challenge: Information on the Urban Landscape

In producing this paper and the maps needed to illustrate the City’s complex urban landscape, it has become very clear that an information gap exists. Information from multiple agencies and sources need to be combined and overlaid to produce a richer and more detailed picture of the District’s urban landscape and community fabric. This enhanced information baseline can become a substantive new tool to help guide and implement the new comprehensive plan policies. To better plan, design and manage the District’s environment the following issues must be addressed:

- System inventories – water/sewer/stormwater, parks/recreation and ecological habitat
- Data converted to digital mapping that is compatible for planning and development community
- Adequate or timely inter-agency information sharing
- Inter-agency agreements on information security

GROWING DC: STRATEGY

Environment as Urban Infrastructure, Development Framework and Employment Strategy

“Caught between opposing forces for beautification and social justice, Washington gained two identities: one closely associated with the federal presence, visited annually by millions of tourists and known as the city beautiful; the other consisting of the city’s indigenous neighborhoods, many of them beset by inadequate housing, soaring levels of poverty and crime, and social disorder.”

– Howard Gillette Jr., *Between Justice and Beauty*

The District of Columbia faces the same planning and design issues in maintaining their environments, landscapes and ecological systems as other American cities. All are faced with inadequate funding, unaligned agencies and an overwhelming demand for more diverse spaces, an increasing mixture of activities, demand for safety, and ecological performance.

The District is facing a system-wide demand to upgrade and enhance the maintenance of its infrastructure, parks and ecological systems. A lot of money will be spent to upgrade these systems to traditional standards. Instead, these precious public funds should be used to do more. Many American cities facing these same challenges are turning to this alternative approach as a means of reducing maintenance costs while enhancing the natural landscape systems of their city and supporting neighborhood revitalization. This type of fundamental infrastructure and natural reconstruction can become a basis for ecologically, socially equitable, and sustainable infrastructure, parks and open space.

The District faces four challenging environmental issues: decaying urban forest, deteriorated air quality, river pollution, and inadequate future power supply. Agency and private sector plans to reduce these environmental problems are based on recommendations calling for extensive inventories of the existing systems, new technologies, low impact infrastructure systems, changing public works standards, changing customer habits of both residents and developers, in addition to timely review and approval processes between agencies.

American cities have learned to underpin their efforts to attract new residents, increase density within existing neighborhoods, and enhance the ecological function of their local environmental systems. This allows the private sector to contribute directly to the city’s infrastructure, parks and open space system through expenditures on services. Developers are turning to such investments in LID (Low Impact Development) site development and certified “green building” standards as market attractions. Neighborhoods have been converting buried streams, updating old parks, and overhauling stormwater systems into new ecologically-based parks and open space. This type of development strategy brings new sources of funding to basic city services.

Neighborhood groups, not for profit organizations, and governmental agencies of Washington, DC have begun to explore many of these ideas in various demonstration projects across the city. These first public and private steps can form a more powerful and comprehensive national and international model of city building. Washington, DC contains some the leading environmental

organizations and new green building corporations. If the District were to capture this local expertise, it could become a world demonstration center for new urban “sustainable infrastructure,” where residents with the latest green technology rebuild their community, enhance their environmental quality and produce new industry.

There are case studies from around the country where cities are integrating the two demands of local natural resources and service infrastructure into one project that generates job opportunities, enhances the tax base, adds amenity and reduces negative environmental impacts. These programs include Buffalo Bayou in Houston, Texas; Low Impact Development Standards and Stream Restoration in Portland, Oregon; the Greening the Great River Program in St. Paul, Minnesota; and Public Arts Works in Phoenix, Arizona.

This strategy of integrating urban infrastructure, parks and ecological systems requires the following performance objectives:

- *The ability to overlay inventories and coordinate capital improvements and maintenance upgrades* to more effectively utilize scarce public funding to improve the quality of the projects and capture possibilities to enhance community public space. Each system needs to be inventoried into digital systems and databases that are compatible with the differing infrastructure interests and ecological processes.
- *Digging up the street once to add and upgrade urban infrastructure* and improve the local environment versus the usual ongoing disruptive process of continual road reconstruction. The water, power, cable and street tree systems all need to be upgraded. By coordinating planning efforts, funding streams and the construction timetable, time saving efforts can attract citizen support for infrastructure repair as well as connect other renewal efforts with businesses and infill housing efforts along these major corridors.
- *Building local employment opportunities and capacity* to bring new technologies into standard building processes. With this comes opportunities to increase the number of jobs and skill levels of local residents through training programs from industry and government. The Casey Tree Endowment Fund is creating a “citizen forester” program. This program trains citizens to become arborists who will in turn help neighborhoods in planting new trees and maintaining their urban tree canopy. Programs like this and others can be used in concert with local human development and job services.
- *Improved interagency review and approval processes*, resulting in powerful sustainability demonstration projects. These “special projects” need to become standard ways of working. A clear path through governmental review and approval processes has been used effectively by cities as a “carrot” to attract high quality private sector development and interagency collaboration and invention.
- *Ecologically based design that reduces infrastructure maintenance costs* and improves the livability of neighborhoods. To plan, design and construct this kind of environmental public work requires more time for design development and project coordination than typical projects. Case studies show that landscape architects, architects and artists working with

engineers from the beginning on these projects have been more politically successful and ecologically more productive than standard engineering contracts. In fact, in many cases, this extra exploration of design alternatives, innovation and detailed interagency work has actually produced projects whose final contract bids have been less than originally budgeted. In other cases, these innovative projects have attracted additional funding from atypical sources that are attracted to their richer cultural and ecological agenda.

- *Intensify the natural systems while adding density* to existing neighborhoods and commercial corridors. Neighbors object to new infill development for three reasons: fear of new residents, loss of economic value and destruction of their landscape. We tend to make new beautiful infill projects and in turn make the adjacent community look under maintained and less natural. As new development is encouraged, DC needs to work to improve the environment of the surrounding neighborhood landscape. New residents will want the same park improved that existing neighbors have asked to be repaired. Infill building sites tend to be key urban sites that can provide the neighborhood access to regional open space networks or additional parks and environmental amenity. The tree canopy within the project and in adjacent areas can be improved to make it more ecologically diverse in planted form and habitat. Landscape will no longer be planted to “mitigate density or buffer uses.”

GROWING DC: OPPORTUNITIES

Opportunity 1: Design new plans and policies to enhance signature terrain features

The District should design its new comprehensive plan and development policies to enhance its two signature terrain features – the Federal plain and the surrounding heights and valleys.

Starting in 1971, the City of San Francisco developed a national model for a comprehensive plan and urban design that was built from the many features of its distinguished natural terrain. The nature and purpose of the plan was defined as...

“It concerns the physical character and order of the city, and the relationship between people and their environment. San Francisco’s environment is magnificent, and the city is a great city, but the unique relationships of natural setting and man’s past creations are extremely fragile.”

Since then, the plan has been a critical guide in shaping new development that is compatible with the city’s topography and cultural landscape. It has been a tool to help shape citywide agendas while serving neighborhood needs and situations.

In the draft report *Parks, Open Space and Natural Features* (NCPC, June 2003) Washington, DC’s topography, from L’Enfant’s time forward, is described as defining and characterizing the capital. This has resulted in thoughtful relationships between urbanized areas and the natural terrain. Ongoing urbanization threatens to diminish the clarity of this historic relationship, resulting in ecological as well as cultural losses. A number of key policy recommendations are offered that should be integrated into the District’s new comprehensive plan. As the list of policies focus on specific topographic features, it illustrates the diversity of landform and natural environments that underpin the District’s neighborhoods. For example,

“Maintain the prominence of the Topographic Bowl formed by lowland and rim features of the L’Enfant City and environs, particularly by controlling the urban natural skylines in the Anacostia, Florida and Arlington County portions of the Bowl. The green setting of the Anacostia hills should be preserved, and building masses should be integrated with and subordinated to the natural topography. The Florida Avenue escarpment’s natural definition of the L’Enfant Plan boundaries should remain evident by retaining developments that are fitted to the landforms and by promoting low-rise development that can be distinguished from the greater height of the L’Enfant core areas.”

The names of the District’s neighborhoods (Congress Heights, Brookland, Mount Pleasant) describe a diverse range of topographic situations that should be used to shape Comprehensive Plan policies and urban design frameworks. Policies and design strategies should build from and respond to local neighborhood terrain. Recognizing these different terrains can be useful in guiding the bulk and height of new development, revitalizing places in decline and directing efforts to enhance the local ecology of natural systems.

Opportunity 2: Reconfigure and aggregate public parks and open space to support neighborhood revitalization

The District should reconfigure and aggregate the triangular open spaces, neighborhood parks, community parks, obsolete property and portions of vacant land inventories. The District's effort to create a new comprehensive plan, information system and resource inventory provides an opportunity to reorient and enhance the District's existing parks, open space and natural ecology to better support targeted neighborhood revitalization, connect new urban infill development, and enhance the park system's recreational, landscape and ecological systems.

Large surplus properties offer not only an extraordinary opportunity for new economic development, but are a pivotal piece of land that can add new and expand existing District environmental assets, parks and tourism opportunities. For example, the property at St. Elizabeths contains stream valleys that can become habitat corridors, attract new development, and provide pedestrian connections and watershed absorption that will enhance adjacent neighborhoods. Containing significant cultural landscapes and natural features, the land builds a link to the Anacostia waterfront and ecological systems. It is a key element of the Topographic Bowl that is described by the NCPC as a critical Washington, DC civic feature in need of protection. Most importantly, reconnecting this land to the natural features and systems of the District opens the imaginative boundaries of possible future uses beyond the grounds of the existing hospital use of today.

Another example is to unite the various small triangular fragments and open space bits of public land into District neighborhoods. Barcelona, Spain has become famous for its public space, gardens and ecological open spaces. In late 1970's, when the City began this work, it had few public dollars and many remnant small public parcels – like Washington DC's triangular bits and square pieces of public land. Barcelona decided these pieces should be tied back into the public realm of the city's many neighborhoods. The city organized its design community under a set of thematic design principles, such as modest budgets, use of durable materials, exploration of local craft, expressions of new cultural trends, and participation by local residents. For Washington, DC, these lands can be used to become part of neighborhood strategies to manage stormwater and be used as ecological filters, producing habitat gardens while they help clean local stormwater.

The goal of this opportunity is to intensify natural systems of the District as it adds density. This is a means through which new value can be added to declining land uses and parcels that have changed in character. Returning to the ecology of the District's natural systems gives new life to worn parcels. This is attractive to both existing and new residents:

- *It stimulates employment development.* Park development tied to public work projects creates jobs and lays the groundwork and for long-term investments that return to the adjacent neighborhoods. As the District upgrades its utilities, the neighborhoods become green.
- *It helps maintain the health of local natural systems.* They provide significant amenity, reduce crime, and add hope and value to the neighborhoods as it reduces the long-term cost of infrastructure.

- *It strengthens neighborhoods through connection and inclusion.* Accessible, well-maintained and safe parks and open space systems are the bridges that cross class and cultural barriers. It is a common denominator that attracts residents and regional visitors with a common interest in this cultural environment. Each Metro station should be linked directly to Washington, DC's 200 year old "green legacy."
- *It is built by overlaying system upgrade projects and stacking funding.* The product is to make infrastructure that contributes to the city's culture and becomes a green addition to its parks, open space and natural systems.

Opportunity 3: Coordinate conservation programs and activities to leverage economic and social capital

The District should integrate the activities of the Casey Trees Endowment Fund, new citizen based "green spaces" conservancy organizations, and schoolyard conservation programs into a comprehensive park and open space reconstruction effort. These activities are the doorway through which residents rediscover, reclaim and rebuild their "green heritage and community connections."

The Casey Trees Endowment Fund's citywide street survey program generated broad citizen participation and support. Residents understand the importance of Washington's moniker of being the "City of Trees." However, the urban forest and community canopy extends beyond its street trees. It spreads into its parks, backyards and schoolyards. Under the 'canopy' of urban forest restoration, this effort contains a wealth of economic and social capital to help neighborhoods be hopeful, school yards remain healthy, and parks become renovated.

As described on their website <<http://dpr.dc.gov>>, the Department of Parks and Recreation and neighborhood groups concerned for their parks and open space have joined together to find a mechanism to add public dollars to the department's budget. These groups now number over 40 and are responsible for such projects as the renovation of Kalorama Park in Adams Morgan, planting traffic triangles in Brookland, and beautifying the grounds of Tenleytown Library.

As generous as these neighborhood groups are though, many neighborhoods of the District are not similarly organized. These communities may face substantive problems relating to crime and urban decay, or they may simply not have a venue or locus for community organizing. Still other parks do not "belong" to any particular communities or groups and are left without advocates and volunteers. Uniting the diverse experiences of the city's parks is the simple, difficult and over-arching reality that the District's Parks and Recreation budget is unable to meet all their needs.

Taking a lesson from the New York City Parks Department, DPR director Neil Albert has envisioned a non-profit group modeled after the Central Park Conservancy to be the catalyst for public-private partnerships to restore the city's system of green spaces. Joined by a board composed of concerned citizens, public park professionals and leaders of several Friend-of-Parks groups, the new organization is called Green Spaces for DC In addition to providing technical

assistance to the DPR and other city agencies, Green Spaces for DC will bring together the 40 existing neighborhood groups to share successful strategies, coordinate efforts, and aid in expanding and developing economic resources.

The DC Department of Health is involved with a program that reconnects schools and their children to the land. The Environmental Health Administration provides grant funds, technical assistance, and resource materials to District Schools. Students, teachers and the community learn to develop and maintain their schoolyards in ways that protect the Anacostia and Potomac River from DC to the Chesapeake Bay. Program material states that nationwide many teachers and environmental educators have developed schoolyard conservation sites that put students in touch with the natural environment. Conservation sites enhance school properties, turning ordinary schoolyards into lush environments for hands-on learning. These sites are vehicles for building student awareness and ownership of their neighbors, city and region. The District's schoolyards are the front doors to reclaiming and developing neighborhood stewardship of water resources, habitat, parks and open spaces. The District's recreation centers should be included in this student and adult environmental education effort. The redesign of these facilities should be models of green building and ecological site design, well connected to other parks and open spaces.

Uniting these programs can add up to an enhanced citywide urban forest and urban landscape. Program leaders can begin to work with the Office of Planning to prioritize their program goals and objectives, focus their energies, reclaim and renovate the environment of target neighborhoods, enrich major urban projects, and help shape the long term Comprehensive Plan agenda. Connecting the urban forest, green spaces and schoolyards is attractive to families planning to stay and invest in making a better city, and to new residents as they seek ways to build connections and grow roots in the community.

Opportunity 4: Rebuild the urban forest to create a stormwater sponge

By rebuilding the District's urban forest, schoolyards, and parks, its open space systems can be used as a tool for reducing stormwater volume, the size and cost of stormwater infrastructure facilities, and Combined Sewer Overflows (CSO) into the Anacostia and Potomac Rivers. These various green enhancements can add up to what might be called an *urban forest stormwater sponge*.

American Forests calculates that the District's loss of trees has cost at least \$230 million in stormwater management value and air pollution removal value.

The American Forests and Casey Trees Endowment Funds analysis of the District's ecological systems cited a 64% decline in its tree canopy. The second finding was an increase in the acres of impervious surface to 47%. These factors directly affect the District's ability to manage urban stormwater at its source, before it enters the combined stormwater and sewer system. Washington, DC is located in a climate, geology and environment where the management of water runoff is a major year round issue. The existing combined stormwater and sewer systems are creating profound river pollution in the Potomac and Anacostia Rivers. DCWASA has developed a plan for the development of an engineering project to hold in underground reservoirs

this growing volume of CSO. This project costs over a billion dollars and may take as long as 40 years to finish. Meanwhile, sewer demands and impervious surface area are increasing in the Maryland suburbs. These factors combine to increase the amount of stormwater flowing into sewer lines and overflowing into the rivers.

Imagine if the District led a citizen and business community effort to infill its neighborhoods, commercial corridors, parks and open spaces with new trees, grasses and low impact site designs. Tied to this effort the District and local experts could work with property owners on methods for reducing impervious surfaces. Though this would not eliminate stormwater runoff entirely, it would go a long way to reducing the flow, enriching the local ecology and reducing the size and costs of stormwater management and treatment facilities. The trees are the first line and edge of the District's stormwater system.

In 1995, with the support of St. Paul's mayor, foundations, and business leaders and coordinated by a small non-profit organization called *Greening the Great Mississippi River*, 7000 citizens of the City of St. Paul, Minnesota planted 35,000 trees and 16,500 grasses. Within six years, the group has planted 4,000 acres of industrial land and low-income neighborhoods on the former flood plain of the Mississippi River. This new urban forest is fully supported by the 93 landowners whose property these plantings cover. It has enhanced the identity and property value of the area. Vandalism has decreased. Stormwater is managed on site and the ecological habit in the area has increased.

Opportunity 5: Combine inventories, re-target neighborhoods and rank priorities for corridor development

Because the city's environmental and infrastructure systems are in such a desperate state, managing agencies and large non-profit organizations, such as the Casey Tree Endowment Fund, realize the critical need to develop baseline inventories. It is a rare in a city's history that tree and water system inventories are underway at the same time. Imagine if stormwater management were coordinated from the top of tree crowns, down to its roots and into bio-streams and wetlands to river as one integrated system.

These infrastructure inventories and eventual strategic investment plans can enhance targeting of neighborhoods for upgrades of existing home stock and for new infill residential. The replacement of the sewer mains and water lines is a 50-100 year event. The funds to upgrade this system to meet the Clean Water Act's regulations and/or daylight a stream should be seen as public dollars that can be used to reclaim neighborhoods.

The process of infrastructure upgrade and/or ecological overhaul takes many years. One of the critical issues for the District is the timing and location of these upgrades. Working with the Department of Parks and Recreation, the identification of target neighborhoods for growth and renovation, water systems inventory and the Casey Tree Endowment inventory should proceed together. Economic development cannot wait until DCWASA finishes its study and passes their plan to the District for review and comment while they are gearing up for construction in areas that are not critical to target neighborhoods.

Inventories from the Departments of Parks and Recreation and Transportation need to be added. It is not clear whether there are adequate park facilities in areas of future growth. Some of the “vacant land” inventory might need to be used for parks and open space.

Opportunity 6: Begin reclaiming the health of the rivers by starting in the watershed

The District should expand the “reach” of the Anacostia Waterfront Initiative by beginning its implementation in the streams, valleys and parkways that flow from the heights through Anacostia neighborhoods to the river basin.

It is extremely important to the District’s future development that the Anacostia River is gaining the attention that it deserves. The polluted river was brought to the attention of the District, region and nation by Anacostia neighborhoods and residents in the early 1990s. The polluted waters, poor access to the riverfront, lack of safe and maintained facilities, and decaying ecology showed the environmental inequity of not only the river’s health but of the adjacent neighborhoods. The challenge to overcome these issues was described as an opportunity for renewal of the Anacostia community. This focus can be seen in the large number of local and regional volunteers who have been involved with the reclamation of Watts Branch, through the work of Washington Parks and People and the Department of Parks and Recreation.

Both the National Park Service and the District have conducted studies for the Anacostia. Their primary focus is on the river’s main channel and waterfront edges. Proposed plans reveal a rich patchwork of cultural and ecological opportunities to reduce negative environmental impact, add new landscapes, and enhance the local ecology. These plans mention the need to restore surface waters and daylight the buried streams that flow from the heights into to the river channel. However, the plans focus their primary economic development along the main channel’s waterfront edge.

What happens if these studies extended their definition of the waterfront’s reach from the main channel up through the streams and into adjacent neighborhoods? As described in early sections of this paper, the Anacostia River is a watershed whose ecological history and operation is defined as much by its branching streams and creeks as that of the main flow. It is a coastal river, whose hydrological fingers reach deep into the surrounding landscape.

Stream restoration and daylighting of buried creeks should be seen not only for their vital role in reducing stormwater runoff and reducing pollution, but as a tool for economic and social development. This idea was proposed in a 1965 NCPC Comprehensive plan for Watts Branch.

A parallel example can be found in the City of Houston, Texas. There, a primary channel of the metropolitan region’s bayou system has been reclaimed. Called Buffalo Bayou, the water currently flows through a deep concrete lined channel. Business leaders, citizens and city are proposing the creation of an 850-acre local ecological and recreational amenity, supported by \$40 million in public, business and non-profit funds. The project is a combination of infrastructure upgrades, ecological water reclamation and neighborhood revitalization.

Applying this approach in DC will have several benefits:

- Restore surface waters and daylight buried streams that flow from the heights into the river channel
- Extend the economic redevelopment of the Anacostia along the creeks and streams that extend from the heights to the river
- Start the economic redevelopment of the Anacostia along the creeks and streams that extend from the heights to the river
- Capture the sewer and water upgrade funds in the Anacostia neighborhoods as a tool of community economic development
- Turn ecological functions of new restoration and daylighting as an amenity to attract families. Infrastructure redesign and ecological reclamation may produce new sites for residential and or park development.
- Development that grows from the neighborhoods will create stronger connections across Interstate 295 and new development along the main channel waterfront. Development of this type will probably be richer and more politically expedient. It is crucial that I-295 be renovated so that stream crossings become bridges rather than pipes. Without this key detail, the reach of the Anacostia from the river to neighborhood will be compromised.

Opportunity 7: Build a digital public design interface

The District needs to construct an information resource system linked to the new Comprehensive Plan's policies and procedures and offering an attractive path through the District approval process. This process should invite the community to participate in a working agenda with their ideas and skills, rather than through meetings.

There is an important lesson to be found in learning why the McMillan Commission Plan was so popular. One of the reasons for its overwhelming success was the way its contents were communicated to the public. Charles Moore and Frederick Law Olmsted Jr. used the press as a conduit, writing in the clear, direct prose to which journalists respond and providing separate, simplified plans for publication. A public relations campaign leaked portions of the report, with drawings, to newspapers. Moore himself wrote a two-part article for *The Century Magazine* on the plan. The press appreciated how the many strands of the report related to each other, forming a coherent vision. *The Washington Post* wrote in an editorial, "Hitherto our public improvements have had no definite scheme including the entire system and making each feature harmonious with all the rest. Now, however, we appear to have done with the haphazard and fitful and have started on a scheme that time cannot render obsolete."

Today we have digital tools to create a medium for public engagement. Not only can this be an effective way to disseminate information, more importantly, it can become a digital design forum to capture ideas and explore alternatives. It may also be used to animate and make boring, complex ideas much clearer.

One example is the web site called NYC OASIS (Open Accessible Space Information System). Designed to promote citizen awareness and assist neighborhoods in adding to the urban tree canopy of New York, the organization conducted a Neighborhood Tree Pilot Project. Using handheld computers, an inventory of trees in three neighborhoods was compiled in the summer of 2002 by local citizens. The data indicates the 322 trees surveyed are worth over \$1,000,000

total and remove 4.3 metric tons of carbon from the atmosphere annually. The data collected on OASIS is displayed in an interactive map showing the tree location and detailed information such as species and size. Maps were also prepared to show the best places to plant new trees.

Opportunity 8: Restore the District’s urban boulevards into “green, pedestrian-friendly” corridors

The District’s radial and orthogonal urban boulevards are multi-functional linear environments. They are powerful inter-neighborhood transportation and land-use bridges. They contain a wide variety of commercial innovation and market opportunities and are the connective backbone to the District’s parks and open system, through which citizens from the region, tourists, and residents travel.

There are a number of District-wide environmental and infrastructure issues that converge on these boulevards that can be used to build a rich environment. Increasing their ecological and urban landscape qualities can improve retail activity, increase infill housing demands, and improve safety. The issues are energy consumption, energy distribution, communication expansion, stormwater and water main upgrades, urban forest reclamation and transportation. If these new improvements and system upgrades were overlaid upon each other and their funds integrated into one collaborative effort to “dig up” the boulevards once, the return would be the replacement of these worn arteries with a restored community activity and natural benefits.

Power Consumption

In their analysis of local energy demands, the District’s Office of Energy proposes to meet energy needs by reducing demand by the commercial sector. They argue that reduced commercial demand will offset increased use in residential development. They state that the procurement of *Energy Star* labeled products and the deployment of green building design concepts/materials will need to become the rule versus the exception if these sectors are going to make significant improvements in energy use and expenditures. Influencing the District’s commercial/industrial sector will be a challenge without financial and policy incentives and supportive City approval processes that encourage and promote less use and more conservation measures.

Power and Information Distribution

Major PEPCO distribution lines could be buried as part of energy saving strategies put forward by the DOE. New communication lines can be added and older systems upgraded. Certain boulevards can become high bandwidth lines that would be attractive to new office, commercial and new residential development.

Urban Forests and Water Lines

The issues of declining urban forests, stormwater management, and upgrading of sewer and water lines are critical infrastructure issues that will require extensive system maintenance and upgrades and affect proposals for greening the city’s boulevards. Many of these boulevards contain mainline water and sewer systems that will to be uncovered and repaired. During

rainstorms they are major catchments that can be used to manage stormwater. Casey Trees Endowment Fund and American Forests research clearly shows that urban trees are critical to reducing energy consumption, increasing retail street activity, and helping to increase transit ridership. These issues are connected. They support the needed reductions in demand and cost that each system is seeking to accomplish on their own.